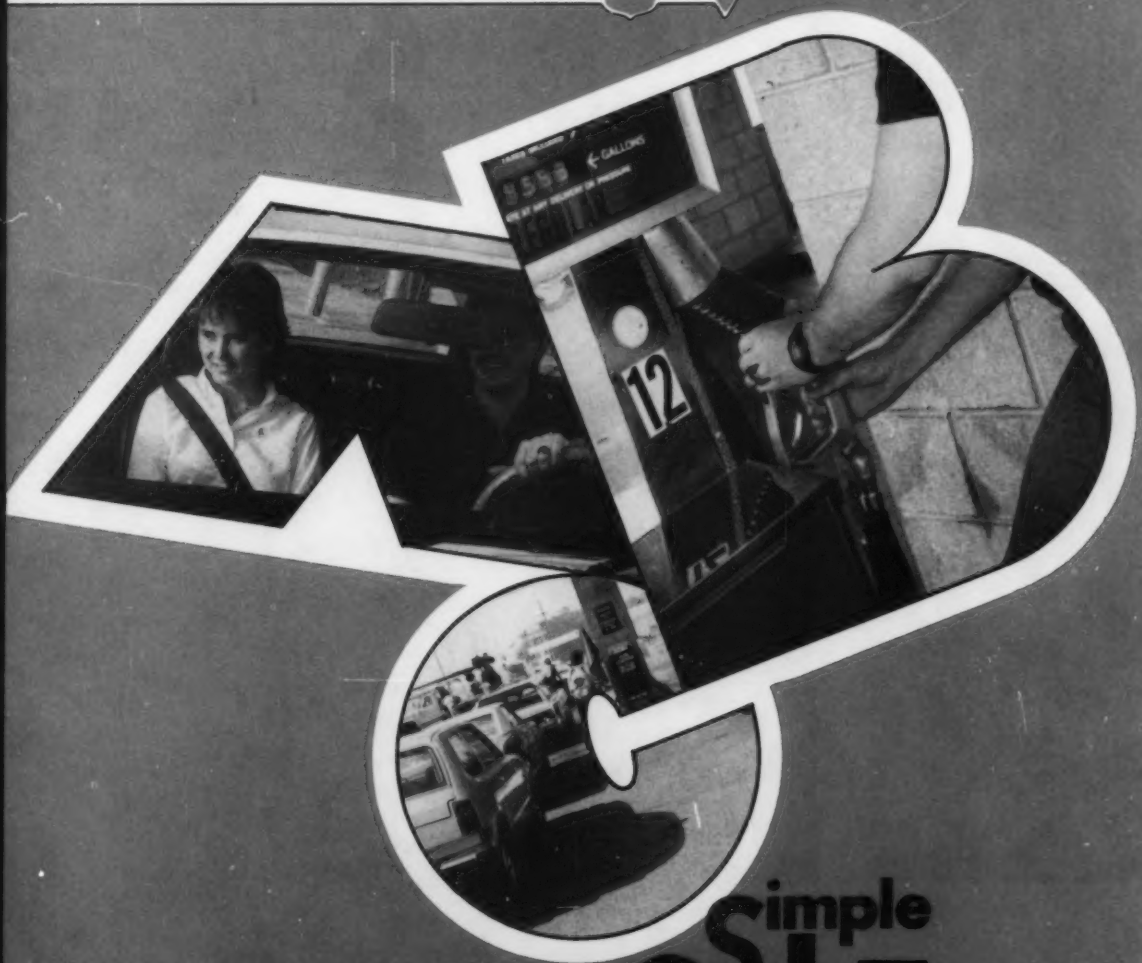
DRIVER

JUNE 1982



simple SELF-Service

- Supercross
- Alex's Adventures in Motorland
- The Backyard Mechanic

(right)
When the tires are cold, air them to the recommended pressure, but don't go any higher than the maximum printed on the sidewall.

Some stations have eliminated full-service in favor of self-service pumps and a cashier.

(right)
Pumping your own gas and servicing your own car is an excellent way to save money.

Hey, Simple! You gonna take all day t' check the oil?

simple SELF-Service

Regular minor servicing can keep your car running better, and therefore more safely.

They've raised the gasoline prices again. We're sure you noticed it as you handed the station attendant a little more of your money. Those of you who've been driving up to the full-service pumps have probably winced as you saw the price on the pump and moved over to self-service. Those of you who've always used the self-service line probably want to get away from there fast and forget it.

"Service" is disappearing from the "service station" because of cost-cutting changes. In recent years more and more stations have eliminated the "full-service" side. Some have switched to just automated pumps and a cashier, which help to solve the stations' problem of people leaving without paying. Some stations don't even have facilities for servicing your car anymore. At certain other stations, the service area may be separate from the pumps, to speed up the flow of customers.

Today at stations that still have full-service you might have to ask the attendant to look under the hood. It might no longer be an automatic service. It's all part of the changing times.

Of course, motorists want to save money, too. The price of full service at service stations has convinced many drivers that they can check their own oil and coolant and save a few cents each time they fill up. However, many drivers, or perhaps most, neglect to make these checks. It's easier to gas up and decide "I can check the oil later." But if you keep putting it off and don't do it at home either, the car won't get the necessary service to ward off future trouble.

"Your serve": All of these reasons might mean your car is getting less service than before. If you're like most of us, your life is pretty busy and you tend to neglect things until they need doing *now*. That's an unwise method of handling chores, especially car maintenance chores. By the time something really needs doing on a car, you're faced with prying many dollars from your fist.

While you put off checking the oil, your car could be consistently running a quart or two low, causing metal parts to rub on each other, destroying the engine. If you don't monitor the coolant level in the radiator, it could be insufficient to keep the car from

continued

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Hon VERNE ORR
Secretary of the Air Force

General CHARLES A. GABRIEL
Chief of Staff, USAF

Lt Gen HOWARD W. LEAF
The Inspector General, USAF

Maj Gen GERALD D. LARSON
Commander
Air Force Inspection and Safety Center

Brig Gen GORDON E. WILLIAMS
Director
Aerospace Safety

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Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM T.C. STEELE, Jr.
Commander
Naval Safety Center

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COL. WARREN L. BUSCH
Chief, Safety Education Division

VIRGINIA HENDRIX
Editor

TSgt RON LATHROP
Technical Editor

JERI ROOD
Feature Editor

CINDY LIGHTHILL
Editorial Assistant

DON KELLEHER
Art Director

LORRAINE HAMBLEN
Staff Artist

ROBERT KING
Staff Photographer

continued

(far left)
Clean off the head and taillights. Dirt can severely limit their light.

(near left)
The oil is one of the most important fluids in the car. You should check it every time you put gas in the tank.

overheating. If you don't watch the tire inflation, they could get so low they will wear out quickly, or even cause handling problems that could lead to an accident.

Regular self-servicing of the car is simple and will eliminate many of the problems that might otherwise happen. And the service station is the logical place to do it. It's more likely you'll do the servicing at the time of fill-up than when you're on your way to a date, or on a weekend when you'd rather be lying in the sun by the pool.

You can do many of the necessary chores in the time it takes you to gas up, plus only a few extra minutes. Why not? Like we said, self-service is simple. Allow us to tell you simple things you can do.

No smoking: The first thing to do after you stop at the gas pump is to turn off the engine. (All servicing, from filling the tank to checking the oil and battery, should be done *only* with the engine off to avoid the possibility of explosions.) Then put out your cigarette. Gasoline vapors are very flammable. A cigarette too near a gas pump or the tank on your car could cause an explosion.

You all know how to pump gas, but here are a couple of reminders that may save annoyance. Make sure the gas pump reads zero dollars before you start to gas up your car. Some pumps need to be zeroed out by the attendant so your purchase isn't added onto the last guy's. Don't forget to turn the handle on the pump that starts the gas flow or you could stand all day pulling the trigger without getting any fuel. Make sure the trigger is not locked open before you turn the handle or gas will spray out.

Remember to put your gas cap back in place after you fill up. If you forget, not only will you lose the cap but you'll also lose some gasoline out the filler pipe as you accelerate away.

You want to avoid spilling the gasoline when you handle the nozzle. Besides the expense and the flammability, spilled gasoline is slippery and caustic and will burn the skin. Keep the nozzle pointed upwards until you put it in the filler neck for the gas tank, and don't touch the trigger on the hose until the nozzle is inserted. Likewise, keep the nozzle pointed up when you return it to the pump.

The vapors: The newer pumps are equipped with a special gasoline vapor-trapping system. You'll recognize it by the accordion rubber sleeve over the nozzle. It's designed to save the gas vapors and cut down on the fire hazards. It makes the pumping of gasoline a little more difficult. Push the nozzle in firmly to make sure the rubber sleeve is contracted because sometimes the gasoline will not flow unless it is. After you have finished pumping

Hey, Simple! You gonna take all day t' change the fan belt?

continued

continued

your gas, wait a moment before extracting the nozzle to make sure all the gasoline has drained into your tank.

Resist the temptation to over-fill the tank or "top it off." The gas needs room to expand during hot weather.

Do it now: Once most folks have their gas, they usually drive away without worrying about the car's other needs. But that's the time for spending a few extra minutes to take care of the regular servicing the full-service attendants used to do.

If the air and water hoses are there with the pumps you should check your tires and radiator there in the line. If the service area is separate from the pump, move out. You may have to anyway, if the cars stack up behind you.

Now we're going to tell you a few of the minor service items you can do while at the station. One thing that'll help make servicing more pleasant: if you keep the engine compartment clean you won't risk dirtying your clothes when you check the oil or battery. Have the engine steam-cleaned. It will be cleaner to work on and you'll be able to see more easily what needs to be done. One thing that will make self-servicing a little faster: when you have your mate or boy/girlfriend along, have him or her help.

Now to those parts that need regular service.

Tires: Once you could tell at a glance if your tires were low on air — if they bulged a little at the side-walls, you went for the compressed air nozzle. Today's steel-belted radials are different — they look a little low all the time. If they don't, they're *over-inflated.*

No matter what kind of tires you have you should check the inflation once a week, or more often if you drive a lot. Check them when they're cold. Use your own pressure gauge because the readings on the gauges at the station will vary. Air the tires to the pressure recommended for your tires. Do not inflate them higher than the maximum, printed on the tires' sidewalls. Too much air will make them wear heavily at the center of the tread, and too little air will make them wear at the edges of the tread. For maximum tread life, keep to that recommended pressure. If the tires are hot and the gauge reads high inflation *do not* bleed air out. If you do, they'll be underinflated when they cool down.

Examine the tires' tread and sidewalls each time you air them up. Cuts, cracks and bulges, as well as excessive or uneven wear, are what you're looking for. If you find a nail or other sharp object stuck in the tread, go to the station's service bays or the local tire store for removal and repair. Don't put it off, because the damage will only get worse and you could have to replace the tire.

Glass and lights: It used to be that the attendant would clean off the windows while your tank was filling. Now, since you're doing the work yourself, you should clean the windshield, all windows and the mirrors while you're stopped. You should have glass cleaner, in a spray bottle, paper towels and maybe a squeegee. For bugs and road tar, carry a covered sponge like the ones the station attendants use.

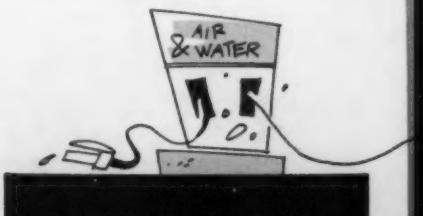
Don't rely on just your wipers and the windshield washer to clean the windshield; those are for when the car is in motion. Working by hand will do a much more thorough job. Clean off the wiper blades and check their condition and the tension of the wipers. If necessary, replace or adjust as soon as possible.

Also remember to clean the inside of the windows. A messy film develops on them because of air pollution and the vinyls used in car interiors.

Remember to readjust the mirrors before you drive away.

Check your lights. Dirty lenses over the headlights can cut down their light by as much as 75 percent. Clean off the headlights, taillights, side turn indicators and the parking lights, so you can see and also be seen by others. Others must see you so they can stop in time.

Check the depth of the tire tread to insure you have enough for safe handling. If you don't have a tread gauge like this one, use a penny. If the top of Lincoln's head shows, your tread is insufficient and the tire should be replaced.



While you're looking at the lights, your partner can switch them and the turn indicators on and step on the brake so you can see if any bulbs are burned out or if there is a short in the wiring anywhere.

Fluids: The various fluids in the car don't get checked as often as they should and that can lead to trouble. Most cars are not equipped with gauges, only indicator lights that show when there's trouble. But it's a mistake to rely on gauges or lights. Check the fluids when you're stopped for gas.

Oil: It's a good idea to check the oil level each time you put gas in the car. Add a can as soon as the dipstick shows you're a quart low. In your trunk, carry a can or two of oil and a

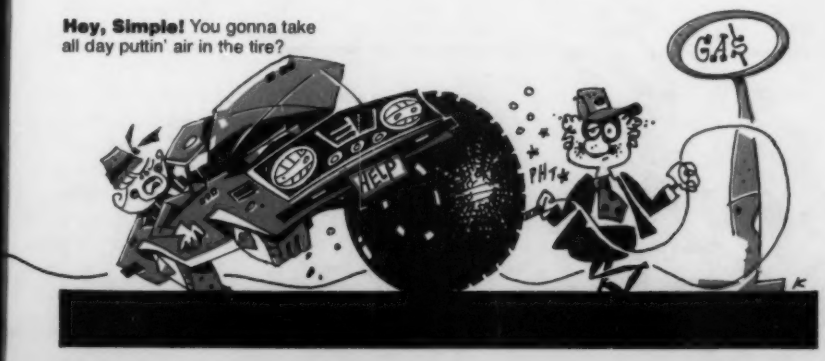
continued

Test the condition of the hoses by squeezing them.

Working together, you and your partner can service the car in half the time.

Keep your face well away from the radiator opening when checking it or adding water.

Hey, Simple! You gonna take all day puttin' air in the tire?



Check the condition of the wiper blades when you clean the windshield.

While one of you sits at the wheel, the other can check to see if all the lights work.

You should carry a funnel with a flexible neck for hard-to-reach fluid reservoirs.

metal pour spout. A funnel and can opener also will do the job. Have a rag handy to quickly wipe up any oil you spill on engine parts.

Coolant: Coolant deserves a regular look to make sure it's up to the mark because it cools the engine in the summer and keeps it from freezing in the winter. Most newer cars have a see-through plastic overflow reservoir you can check to see that enough coolant is there. If the coolant level is low, fill to the "full hot" or "full cold" mark, depending on your engine's present temperature. Add water or coolant to the overflow reservoir only.

On older cars you'll have to check the radiator itself. Make sure the system is cool enough so you can remove

Be careful not to spill any gasoline when handling the hose and nozzle.

It only takes a few seconds to check the fluid levels in the engine.

Car Kitson here with a kit for your car, son . . .

SELF SERVICE KIT

When you're just driving around town and commuting to work you don't need to carry a lot of tools and supplies. They take up too much space and weigh too much, and they rattle around in your trunk. Here's a good basic kit for use in servicing your car at the gas station.

- **One or two cans of oil**
- **Coolant**

the radiator cap without coolant shooting out and burning you. With the engine running, run water over the radiator for a few minutes. Shut off the engine, and protect your hands with a towel or gloves as you let out the pressure in the cap and remove it. Don't put your face over the opening as you look, just to be safe.

Battery: An occasional look inside the battery will avert a lot of problems. If you don't keep the electrolyte level up in each cell of the battery, you'll eventually find the car won't start. Pop the caps out and look in each cell; fill any that are low with distilled water. (Tap water has too many minerals.) You can carry a small bottle of distilled water in your trunk for this purpose. Check the battery cables and the terminals. Any corrosion you find should be cleaned off as soon as you can.

One last thing: Buckle up as you leave. All this servicing for safety does no good unless the driver is safe too.

Windshield washer: Take a quick look in the windshield washer reservoir. If it's low, add water and the windshield washer solution to the proper ratio. Check the washer hoses for leaks and the sprayers for clogs.

Transmission fluid: If you have an automatic transmission, about every 1000 miles check the fluid according to the instructions in your car's owner's manual. Look carefully; the dipstick is usually hard to find, and often hard to reach. If the fluid is low your transmission will be slipping. Make sure you have the proper fluid — there are different types for different car makes.

Power steering and brake fluids: Occasionally check both of these. If they get low, your handling and stopping will be affected and that's dangerous.

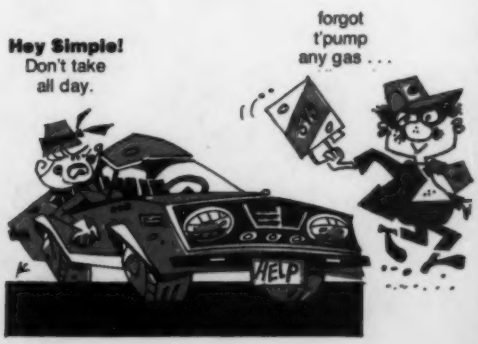
Hoses and belts: Check the belts for fraying or glazing, and the hoses for unusual softness or hardness. Replace worn items as soon as possible. Also, check the clamps, the wiring and the spark plug wires.

Many small cars have cooling fans that switch on automatically when the hot engine is turned off. Be careful to stay out of the way of these. As for the regular engine fan, don't service under the hood with engine running and you won't have to worry about it.

There. That wasn't so bad, was it? In a very few minutes you can check over these things on your car and avoid possible maintenance trouble in the future. It just takes a commitment to make your car last, and to making it safe. Take those few minutes for simple self-servicing.

- **Brake fluid**
- **Power steering fluid**
- **Automatic transmission fluid**
- **Distilled water (for the battery)**
- **Window cleaner**
- **Paper towels**
- **Sponge, and maybe a squeegee**
- **Rags, and perhaps gloves**
- **Oil spout**
- **Funnel**
- **Tire pressure gauge**
- **Tire tread depth gauge**
- **Tools — Screwdrivers, Phillips and regular**
  Pliers
  Adjustable wrench

However, if you want to carry more than this, don't let us discourage you. Who knows when you might need a complete socket wrench set?



Flying bikes, riders and dirt make motorcross the most spectacular of all motorsports.

supercross

Motorcross is probably the most spectacular form of motorsports there is. The professional riders take what look to be everyday dirt bikes and churn them around impossibly tight corners and sail them 40 feet from one jump to another with such ease it appears almost anybody could do it.

That's why they're pros: They can make very difficult tasks look easy . . . and safe.

Despite their youthful appearance (most are 18 to 20 years old, with "over the hill" coming abruptly at 25) most of the riders in the Wrangler Super Series are seasoned professionals. They've been at their sport for years and are pound-for-pound as athletic as any pro-sport player you can name. They're also as dedicated to their craft as anybody can be.

It's practice, practice, practice and conditioning, conditioning, conditioning for the riders — or MXers, as they're known — just as it is for any professional athlete. Although they race at the national level more than 30 times a year, they still practice their riding skills six or seven days a week. And this practice is not just once around the back yard or across the vacant lot and back; it's a full work out for a full work day!

A typical MXer's daily conditioning program begins with a brisk walk to warm up before jogging a mile or so, and then running five to 10 miles. That is followed by kneebends (60), toe raises (50), pushups (25), waist stretches (15), toe touching (5), bicycling (1 minute), scissors (90 seconds), neck snap and rolls (80), arm circles (1 minute), isometrics, weight lifting, headstands (for balance) and a slow cool off.

As with so many sports, the basic tools are available to anybody. However, that doesn't mean that just anybody is capable of doing what the pro

One advantage that MXers have over other dirt riders is they go over and over the same course time and time again. They know what's coming up next.

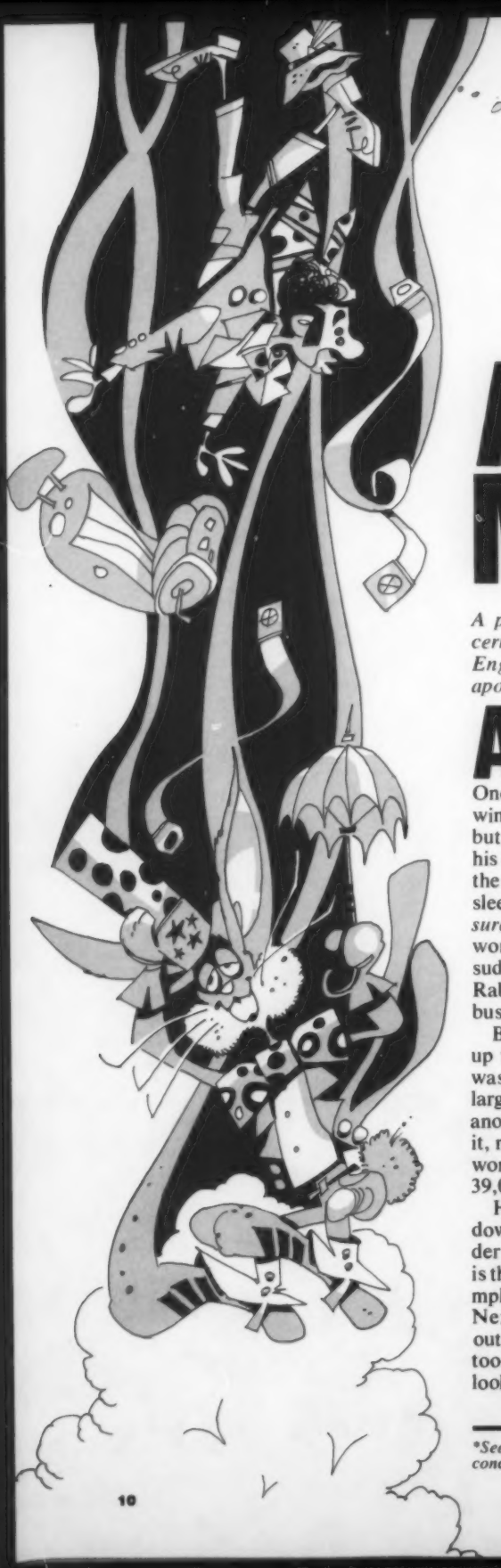
does with the equipment. Just as a glove, baseball, uniform and hat don't mean that Joe Average can deliver a 100-mph-plus fastball across the strike zone, a dirt bike doesn't mean that Rex Kars will be able to soar from a hill 12 feet off the ground and land on another 40 feet away.

Leave the spectacular performances to those who race in the Supercrosses, and make your dirt riding sensible and safe.

Forty racers funneling into a switchback turn at the start of a Supercross is a sight not soon forgotten.

(left, right and lower left) Bob "Hurricane" Hannah shows the form that has won him more American Motorcyclist Association motorcross races than anyone in history.

(right) Safety equipment is extremely important to motorcross riders. In addition to the standards such as helmet, eye protection, gloves, leathers and boots, a close look will show that they also strap on a lot of padding under and over their team colors.



ALEX'S ADVENTURES IN MOTORLAND

A partial guide to the safety concerns of the Society of Automotive Engineers' annual meeting, with apologies to Lewis Carroll.*

Alex was beginning to get very tired of sitting on the plane, and of having nothing to do: Once or twice he had peeped out the window, but there was nothing to see but night. So he was considering in his own mind (as well as he could, for the airline meal made him feel very sleepy and stupid), whether the *pleasure* of going to Detroit in March was worth the trouble of flying, when suddenly a 6-foot-½-inch tall White Rabbit in a three-piece medium grey business suit ran up the aisle.

Burning with curiosity, Alex ran up the aisle after it, and fortunately was just in time to see it pop out the large door at the front of the cabin. In another moment out went Alex after it, never once considering how in the world he was to survive the fall from 39,000 feet.

He had plenty of time as he went down to look about him, and to wonder "if falling off a six-story building is the same as hitting a brick wall at 60 mph, how hard am I going to land?" Next, he tried to look down and make out what he was coming to, but it was too dark to see anything; then he looked to the sides, and noticed that the air was filled with empty car seats. Here and there he saw safety belts all unfastened and unused. He took a box from one of the seats as he passed; it was labelled "AIRBAG," but to his great disappointment it was empty, so he put it into one of the seats as he fell past it.

"Well," thought Alex to himself, "if I'd kept my belt on, I'd still be in the airplane. And if all these people had worn their safety belts they might still be alive!" (Which was very likely true.)

Down, down, down. Would the fall *never* come to an end! "I wonder how many of the 44,200 people killed in

Space-age road maps help motorists find their way using data from Transit Satellites that can locate the car with accuracy within 400 meters anywhere in the world.

**See May 1983 DRIVER for more SAE safety concerns*

motor vehicle accidents during 1982 would still be alive today if they'd been more responsible about their own safety and used these cost-effective existing seat belts?" he said aloud. "I think I recall hearing — or reading — that a one percent increase in belt-wearing equals the saving of 182 lives, I think — " (for, you see, Alex had learned several things of this sort in his reading of *DRIVER Magazine*, and though this was not a *very* good opportunity to show off his knowledge, as there was no one to listen to him, still it was good practice to say it over) " — yes, that's about right — but then I wonder if it can be proved that seatbelt programs are working. After all, what is known of accidents that don't happen, or accidents that are less than they could have been?"

Down, down, down. There was nothing else to do, so Alex soon began talking again. "I wonder what people *think* their chances of having an accident are? I *think* they *think* the chances are one in a thousand but I shall have to tell them that the real chances are more like one in seven or one in ten."

He felt that he was dozing off, and had just begun to dream when suddenly, thump! thump! down he came upon a heap of luggage in the baggage claim area of the Detroit Metro Airport, and the fall was over.

Alex was not a bit hurt, and he jumped up on to his feet in a moment. Before him was a long passage, and the White Rabbit was still in sight, hurrying to catch the limo bus to downtown. There was not a moment to be lost. Away went Alex like the wind, and was just in time to catch the bus himself. He was close behind it when he stepped onto the bus, but inside the Rabbit was no longer to be seen.

The only things on the bus that were not birds and beasts speaking what sounded like Japanese, were a large German Shephard which disappeared into the rest room and a large cat which was sitting in the driver's seat.

"Please would you tell me," said Alex, a little timidly, for he was not quite sure whether it was good manners for him to speak first, "why it is so hot in here like this?"

"It's solar heating," said the Cat, "and that's why."

So, he took courage, and went on again: — "I didn't know that buses were solar heated; in fact, I didn't know that vehicles *could* be solar heated."

"They all can," said the Cat; "and most of 'em are."

"I don't know of any that are," Alex said very politely, feeling quite pleased to be holding his own in the conversation.

"You don't know much," said the Cat, "and that's a fact. Cars sitting in direct sunlight have been found to reach interior temperatures as high as 160 degrees Fahrenheit with surface temperatures as high as 200 degrees. These oven-like levels can pose a threat to humans and pets."

Alex did not at all like the tone of this remark and thought it would be as well to introduce some other subject of conversation.

"Driver," he began, "what's that TV-like video display?"

"A new inertial guidance system similar to those of the big jets," the Cat said. "With one glance I can see where I am, where I've been, and where I'm going. I can use it to select the best route to get where I want to be, choose a better alternate route

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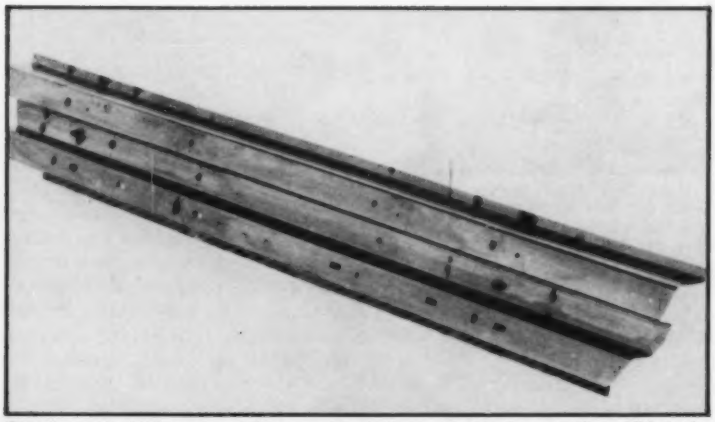
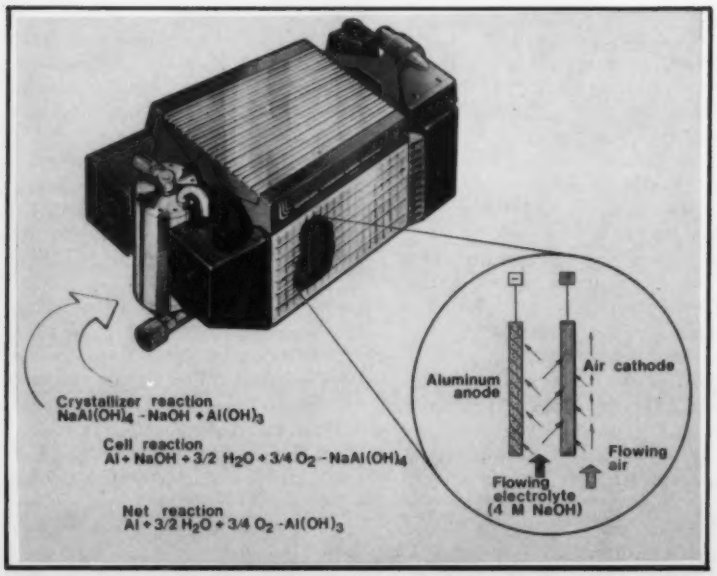


Steel used in this bumper reinforcement is six times stronger than previous mild steels.


Crystallizer reaction
$NaAl(OH)_4 \rightarrow NaOH + Al(OH)_3$
Cell reaction
$Al + NaOH + 3/2\ H_2O + 3/4\ O_2 \rightarrow NaAl(OH)_4$
Net reaction
$Al + 3/2\ H_2O + 3/4\ O_2 \rightarrow Al(OH)_3$
Aluminum anode
Air cathode
Flowing air
Flowing electrolyte (4 M NaOH)

The aluminum-air battery is an advanced electrochemical energy source that promises to give electric vehicles long range, rapid acceleration and fast refueling.

continued

when necessary, and drive more safely on unfamiliar roads, especially at night."

"Driver," Alex said, "would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the Cat.

"I don't much care where — " said Alex.

"Then it doesn't matter which way you go," said the Cat.

" — so long as I get *somewhere*," Alex added as an explanation.

"Oh, you're sure to do that," said the Cat, "if you only walk long enough."

Alex felt that this could not be denied, so he tried another question. "What sort of things are about here?"

"In *that* direction," the Cat said, waving his right paw round, "is Cobo Hall and the SAE convention: and in *that* direction," waving the other paw, "are the hotels and the SAE conventioneers. Visit either if you like: they're all mad."

"But I don't want to go among mad people," Alex remarked.

"Oh, you can't help that," said the Cat: "We're all mad here. I'm mad. You're mad."

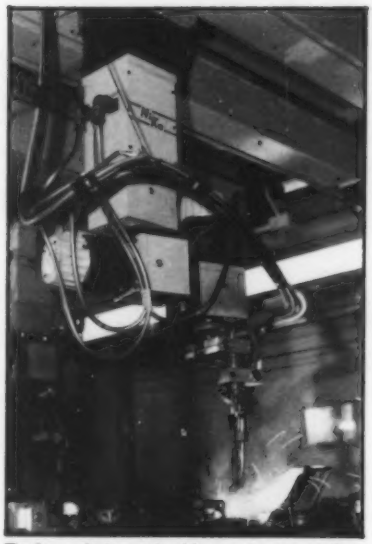
"How do you know I'm mad?" said Alex.

"You must be," said the Cat, "or you wouldn't have come here."

Alex didn't think that proved it at all, but the bus and the Cat vanished. Alex was not much surprised at this, for he was getting used to queer things happening. But he was sure that the Cat's grin was still watching him as he walked on in the direction in which the SAE convention was said to be.

He had not gone much farther before he came in sight of Cobo Hall and the SAE convention: even then he walked up towards it rather timidly, saying to himself "Suppose they should be raving mad after all! I almost wish I'd gone to see the Daytona Motorcycle Speedweek races instead!"

Inside the building Alex walked down a little passage: and *then* — he found himself at last inside the Exposition Hall, among the brightly lit displays.



Today robots spotweld cars; tomorrow they may inspect and sort products, manipulate feedback-controlled assembly, and process and control "smart" remote operations.

Steel and Aluminum were at the forefront, with a great crowd assembled about them — all sorts of Diesels and Computers, as they all milled about handing each other business cards. A Battery was standing before them with Brakes on each side; and near Steel was the White Rabbit.

Alex had never been in an Exposition Hall for automotive engineers before, but he had read about them in *DRIVER* and was quite pleased to find that he knew the name of nearly everything there. "That's Steel," he said to himself, "because he's always displaying strength and talking about 'surface finishes.' "

Then there was Aluminum which went stamping about, and shouting "Off with weight!" or "Heat exchange!" or "Aluminum-Air Battery!" about once a minute.

"And everywhere there's Diesels," thought Alex, "and those creatures," (he was obliged to say "creatures," you see, because some of them were animals, and some were birds), "I suppose they are Exhibitors." He said this last word two or three times over to himself, being rather proud of it; however, "salesmen" would have done just as well, even though they weren't really *selling* anything.

The Diesel Exhibitors were all very busily showing off things such as "Electronic Full Authority Diesel Fuel Injection Systems," "Injectors," "Turbocharged Diesel Engine Conversions for Small Cars," "Comprex," and the like.

The Exhibitors — whether they were Diesel or Battery or Plastic or whatever — all talked at once without waiting for turns, voicing enthusiasm all the while, and fighting for listeners.

Alex began to feel very uneasy. To be sure, he was looking about for some way of escape, when he noticed a smaller-size battery.

"A conventional battery that can deliver starting power comparable to ours is about one-third larger and heavier than our 32-pound unit," the Battery Exhibition said. "This is especially important for down-sized cars with smaller engines which actually require more starting power than cars with larger engines, yet have less room under the hood," the Exhibition continued, without allowing room for Alex to join in the conversation, "the potential for . . . " The Battery Exhibition's spiel faded into the din of the Hall.

Next, Alex stretched himself up on tiptoe and peeped over the edge of a counter, and his eyes immediately met those of a Cubot that was sitting on top with its two manipulators working a Rubik's Cube, and taking not the smallest notice of him or of anything else.

The Cubot and Alex looked at each other for some time in silence. At last the Cubot finished the Rubik's Cube, put it down, and addressed him in a languid, sleepy voice.

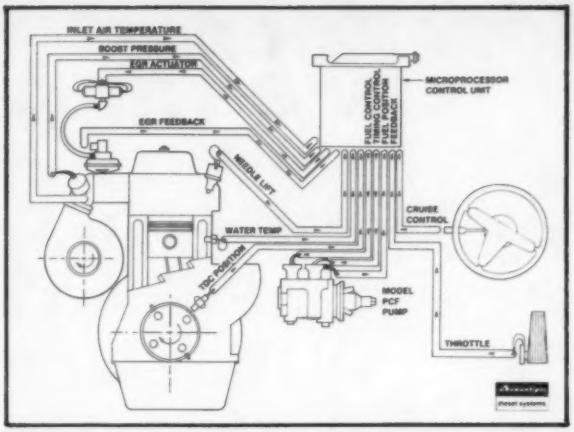
"Who are *you?*" said the Cubot.

This was not an encouraging opening for a conversation. Alex replied, very gravely, "I think you ought to tell me who *you* are, first."

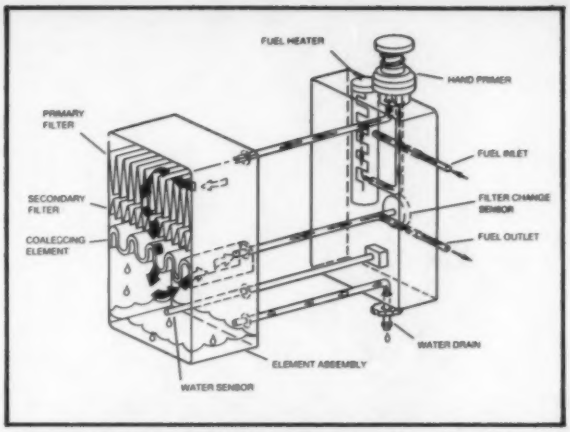
"A robot that can return the cube's faces to a uniform color in three minutes or less," said the Cubot sternly.

"Some humans can solve the cube in less than half a minute," said Alex.

"A computer looking at one combination every millionth of a second would require well over one million



Electronic Full Authority Diesel Fuel Injection Systems will assist diesel engine manufacturers in meeting future worldwide vehicle emission standards.



A one unit fuel filter and fuel/water separator with optional fuel heater has been developed for diesel engine applications.

years to examine them all," said the Cubot.

"I don't see," said Alex.

"I combine color vision, adaptive intelligence and mechanical dexterity," said Cubot, "to illustrate the potential of modern robotics technology."

"Is that all!" said Alex, walking away.

"Want to make a telephone call?" asked the Hawker in an encouraging tone.

Alex looked all round the display dash of a car, but there was no telephone. "I don't see any handset," he remarked.

"There isn't any," said the Hawker.

"Then it wasn't very civil of you to offer it," said Alex angrily.

"Just put the trip computer into the dial mode," said the Hawker, "then press the desired numbers, just as you would a push-button home telephone, and the trip computer displays the dialed number, disconnects the radio speakers and switches them to the telephone system."

"And I could keep both hands on the wheel," Alex added, "while engaged in a telephone conversation."

"Exactly so," said Hawker.

"Ah, so," said Alex, as he moved on.

Suddenly a million or more business cards rose up into the air and came flying down upon Alex. He gave a little martial arts yell, half of fright and half of anger, and tried to beat them off.

"Wake up, sir!" said the Stewardess; "Why, what a long nap you've had!"

"Oh, I've had such a curious dream!" said Alex, and he told the Stewardess, as well as he could remember them, all these strange Adventures of his that you have just been reading about; and when he had finished, the Stewardess said, "It was a curious dream, sir, certainly: but now it's time to land in California." So Alex put his seatback in its full upright position, returned his tray to its stored position, and put his carry-on baggage back under the seat, thinking while he did this, as well he might, what a wonderful world the Society of Automotive Engineers must have planned for the future.

Information in this story taken from the 1983 SAE International Congress and Exposition "Seat Belt Education Programs" technical session with: Al Siechter, EVAK Systems, Inc., president; Neil Shilke, General Motors Research Laboratories assistant department head; Michael Brownless, National Highway Traffic Safety Administration's director of the Office of Occupant Protection; John MacDougall, former supervisor of Motor Vehicles, American Telephone and Telegraph; William Bartlett, Dow Chemical safety specialist; Terry Horne, GM Environmental Activities senior project engineer; C. Thomas Terry, GM Environmental Activities staff engineer; and Herb Kaufman, SAE staff engineer. Additional information from SAE papers: 830073, "Thermal & Solar Effects on Vehicle Components," Ward J. Atkinson and Douglas W. Johansen, Sun Test Engineering; 830659, "Electro Gyro-Cator," Katsutoshi Tagami, Tsuneo Takahashi and Fumitaka Takahashi, Honda Research and Development Company; 830341, "The Robot that Solves Rubik's Cube," F.R. Reich, R.D. Dyer, P.D. Bondurant, R.C. Kelly, J.S. Hartman, L.S. Dake, M.A. Lind and S.D. Roser, Battelle, Pacific Northwest Laboratories; and 830199, "CommCar — An Integrated Approach to In-Vehicle Telephones," Joseph J. Sanctorum, Michael E. Medvec, Michael R. Seeger and Michael A. Staszel, Ford Motor Company.

Precision injector nozzles can mean increased engine performance and reduced noise and emissions for diesel engines.

New battery plate technology is a prime source of increased starting power in the new, lightweight battery shown in front of a conventional battery illustration.

How Keen are YOUR MOTORCYCLE RIDING SKILLS?

From looking at one, it would be easy to assume that a motorcycle is a rather simple machine. After all, a motorcycle only has two wheels, handlebars instead of a steering wheel, and is more like a souped-up bicycle than a piece of high-tech transportation hardware. Right?

Wrong. And in some cases, that assumption could prove to be deadly wrong.

Today's motorcycles represent the highest level of sophisticated state-of-the-art technology. They are powerful, fast, complex machines. Because of a motorcycle's fuel efficiency, they are rapidly becoming a popular alternative to the automobile for economy-minded consumers.

Riding today's motorcycle requires more attention to skills than ever before. Just consider this: Experts have identified a total of 850 individual tasks — such as turning on the ignition, putting a foot on the brake, putting the car in gear, etc. — which are required to start and operate a standard automobile. By contrast, operating a motorcycle requires a total of some 2500 tasks. That's about three times the effort it takes to operate a car! And that means skill counts.

Providing rider training which emphasizes the proper operation of the motorcycle is the primary mission of the Motorcycle Safety Foundation — a national nonprofit organization which offers programs in rider education, licensing improvement, public information and research and is sponsored by four leading motorcycle manufacturers: Honda, Yamaha, Kawasaki and Suzuki.

"We want people to learn the right way to ride," says Lyle Andersen, MSF's Western Regional Director, "That's the best way for people to get the maximum enjoyment out of their motorcycle riding experience."

MSF rider training courses for both beginners and advanced riders are offered at some 65 Air Force bases around the world. For complete information about a course near you, call your installation ground safety office.

In the meantime, you may want to take a few moments and check out your knowledge about riding skills by taking this quiz. All of the questions are based on MSF's "Motorcycle Operator Manual" and represent the kinds of skill and knowledge taught as part of the Foundation's "Motorcycle Rider Course." Good luck!

THE QUESTIONS

1. True or False. Gloves impair a motorcyclist's ability to grip controls firmly and should not be worn except in bad weather.

2. True or False. When properly adjusted, side mirrors should not show any portion of the rider's body.

3. The proper body position for riding a motorcycle is:

A. Sitting so that arms are absolutely straight when holding the handlegrips.

B. Sitting so that arms are slightly bent when holding the handlegrips.

C. Sitting so that arms are bent at a 90 degree angle when holding the handlegrips.

4. True or False. A motorcyclist should never press his/her legs against the center portion of the motorcycle in order to avoid being injured by contact with hot portions of the motor.

5. At what speed do most motorcycle accidents resulting in injuries occur?

A. 50 mph

B. Over 65 mph

C. Less than 30 mph

6. When approaching a curve a motorcyclist should:

A. Reduce speed before entering the curve.

B. Wait until the mid-point of the curve to reduce speed in order to leave the curve at a safe speed.

C. Maintain the same speed throughout the curve.

7. True or False. The most powerful brake on a motorcycle is located on the front wheel.

8. When braking, a motorcyclist should:

A. Apply the front brake first, then the rear.

B. Apply the rear brake first, and then gradually apply the front brake.

C. Apply both brakes at the same time.

9. True or False. It's a good idea to ride with your motorcycle headlight on during the daylight hours.

10. The best riding position within the traffic lane for a motorcycle is:

A. As close to the left hand divider line as possible.

B. The center portion of the traffic lane.

C. The right hand portion of the lane, at least two feet from the edge of parked vehicles.

11. The greatest danger facing motorcycle riders is:

A. Cars on side streets that pull into the lane of traffic occupied by the motorcyclist.

B. Speeding motorists on freeways and expressways.

C. Oncoming cars that turn left in front of the motorcyclist.

12. True or False. On right-hand curves, it's best for a motorcyclist to position his/her vehicle just to the left of center within the traffic lane.

13. The proper "cushion" of distance between a motorcyclist and other vehicles is:

A. At least 5 seconds of reaction time.

B. At least 2 seconds of reaction time.

C. Sufficient time for the motorcyclist to feel safe.

14. True or False. There is no problem with a motorcycle sharing a traffic lane with a car.

15. The best thing to do when someone is following your motorcycle too closely is:

A. Increase speed to put greater distance between your motorcycle and the other vehicle.

B. Safely pull over to the side of the road and stop.

C. Change lanes and let the other vehicle pass.

16. True or False. The grease strip in the center of a traffic lane is dangerous and should always be avoided.

17. When making a quick turn:

A. Accelerate and lean your body away from the turn as you direct the motorcycle toward the turn.

B. Maintain an upright position with arms bent and elbows pointing away from the turn direction.

C. Lean quickly in the direction of the turn.

18. When carrying a second passenger on a motorcycle, the passenger should be told to:

A. Get on the motorcycle after the engine is started.

B. Get on the motorcycle and wait for the engine to start.

C. Wait for the engine to start and then jump into place as the motorcycle begins to move slowly forward.

19. True or False. One motorcycle operating alongside another motorcycle provides good protection from errant car drivers.

20. When riding in a group, the best formation for motorcyclists is:

A. A straight, single-file line in the center of the roadway.

B. A staggered line moving from left to right within the roadway.

C. Two abreast in a straight line.

THE ANSWERS

1. False. Gloves are extremely important. They give the rider a better grip and help protect the hands in case of an accident. The best gloves are made either of leather or very heavy cloth.

2. False. Each mirror should be adjusted to let the rider see the lane behind and as much as possible of the lane next to the motorcycle. When properly adjusted, a mirror may show the edge of a rider's arm or shoulder — but it's the clear view of the road behind and to the side which is the most important consideration.

3. B. The rider should sit forward enough so that his/her arms slightly bend when holding the handlegrips. Bending the arms lets the rider turn the handlebars without having to stretch.

4. False. Riders should keep knees firmly against the gas tank. There should be no heat generated in this area. This will help the rider maintain balance as the motorcycle turns. Keeping the feet firmly on the foot pegs is another way to help maintain rider balance.

5. C. Statistics show that most riders are traveling at less than 30 mph when they get hurt. At these speeds, hel-

continued

mets can cut both the number and severity of head injuries by half. No matter what the speed, unhelmeted riders are three times more likely to die from injuries than riders wearing helmets at the time of an accident.

6. A. Reduce speed before entering a curve. The rider can always speed up as he/she comes out of a curve depending on safety conditions.

7. True. The front brake is more powerful than the rear brake. The front brake provides about three-quarters of a motorcycle's total stopping power. The front brake is not dangerous if used properly. Proper braking is one of the important skills included in MSF's basic rider training course.

8. C. Apply both brakes at the same time. Some people believe that the rear brake should be applied first. That is not a good idea. The sooner the front brake is applied, the sooner the motorcycle will start slowing down.

9. True. The best way to help others see you and your motorcycle is to keep the headlight on at all times. Studies show that during the day a motorcycle with lights off is twice as likely to go unnoticed by other road users.

10. B. In general, the center portion of the lane is the best position for riders when it comes to being seen. Some people feel that riding in the center portion of the lane is dangerous. They argue that the grease strip which often appears in this portion of the roadway is slippery and will cause riders to fall. MSF believes such fears have been overstated.

11. A and C. Oncoming cars that turn left in front of the motorcyclist and cars entering from side streets are the two greatest dangers to riders. Never count on eye contact as a sign that a driver has seen you and will properly yield the right of way. All too often, the motorist looks right at a motorcyclist and still fails to "see" him/her.

12. True. On right-hand curves, a left-center position is best. It lets the rider see oncoming cars fairly early without putting the rider so far left, risking the danger of being hit by a car trying to "cut" the curve by drifting into the adjacent lane.

13. B. Normally a rider will need a minimum of 2 seconds between the motorcycle they are riding and the vehicle ahead. Here's how to gauge the proper distance: 1) Pick out a marker on or near the road ahead; 2) When the rear bumper of the vehicle ahead passes the marker, start counting off the seconds — "one-second-one, one-second-two," etc; 3) If you reach the marker before you reach "two," you are following too closely.

14. False. Cars and motorcycles both need a full lane to operate safely. Drivers should not share lanes with motorcycles and motorcycles should not share lanes with cars.

15. C. If someone is tailgating, don't try to lose them by speeding up. You'll probably end up being tailgated at a faster speed. The only safe way to handle a tailgater is to get the other vehicle in front of you. To do this safely, change lanes and let the other vehicle pass. If this can't be done safely, slow down and open extra space ahead of you. This should encourage the other vehicle to pass. If he doesn't, at least you will have left yourself and the tailgater more time and space to react in case an emergency develops up ahead.

16. False. Under normal conditions, riding in the grease strip is not dangerous. However, the grease strip can become dangerous when wet. When it starts to rain, move out of the center portion of the lane entirely, and ride in the tire tracks left by cars. Often the left tire track will be the best position. However, you should change your lane position depending on traffic and other roadway conditions.

17. C. The key to making a quick turn is to get the motorcycle to lean quickly in the direction you wish to turn. The sharper the turn, the more the bike must lean.

18. A. Get on the motorcycle after the engine is started.

19. False. Never operate directly alongside another motorcycle rider. If one of you has to avoid a car or something on the road, there would be no place to go. If you have something to say to another rider, wait until you are both stopped. Then pull up alongside.

20. B. Riding in a staggered formation, the leader rides to the left side of the lane, while the second rider stays a little behind and rides to the right side of the lane. A third rider would take the left position, a normal two-second distance behind the first rider. The fourth rider would be a normal two-second distance behind the second rider, and so on.

1983
MAKE IT CLICK Survivor Story

Dear Survivor,

Congratulations. You MADE IT CLICK for all of us by clicking into the use of restraints. What follows is a voluntary request for information about the crash you survived. Your story will be included in a master file maintained by the Air Force Inspection and Safety Center to measure the effectiveness of safety belts. Selected stories and photos will be published in either the DRIVER magazine or USAF Safety Journal to help convince others of the lifesaving value of safety belts. All stories received will be used for an analysis to measure safety belt effectiveness in various types of vehicles and crash locations.

Thank you for sharing your story with us. It will help save other lives.

TYPE OF RESTRAINT SYSTEM

___ Safety belt - (lap)
___ Safety belt - (lap and shoulder)
___ Automatic Safety Belt
___ Automatic Air Bag

AGE OF SURVIVOR

(If multiple survivors, please indicate)

___ 1 day to -9 months
___ 9 months -4 yrs of age
___ 4 - 12 years of age
___ 12 - 18 years of age
___ 18 - 30 years of age
___ 30 - 45 years of age
___ 45 - 60 years of age
___ Over 60 years of age

DATE OF CRASH/ACCIDENT

_____ Month
_____ Day
1983 Year

VEHICLE MAKE, YEAR, AND MODEL

_____

_____

NUMBER OF PEOPLE, EXCLUDING YOURSELF, IN SAME VEHICLE

_____

NAME OF SURVIVOR AND CURRENT ADDRESS

_____

_____

_____

SEND TO:

HQ AFISC/SEDD
MAKE IT CLICK
NORTON AFB, CA 92409

DESCRIPTION OF CRASH

_____

_____

_____

_____

_____

_____

The SEATBELT crusade

by SSgt C. Bizzel
FE Warren AFB, Wyoming

Do you wear your seatbelts? How about your passengers?

The 2139th Comm Sq at FE Warren AFB, Wyoming is really turning seatbelt usage into a crusade. Squadron members are getting to work early and staying late to do seatbelt checks in the parking area. All personnel wearing their seatbelts receive a ticket making them eligible for a quarterly drawing for a dinner for two compliments of Lt Col Phillip J. Andreski, Commander. Those not wearing their belts not only don't receive tickets for dinner, but they also get a chance to meet and chat with Lt Col Andreski personally. This might become a thing of the past because on the last seatbelt check, 50 vehicles were checked with only one offender caught.

But seatbelt checks aren't the only way they promote usage. Each section is tasked with a safety project quarterly. They have to devise ways to insure proper safety practices and procedures are used, whether on or off the job.

The AFSATCOM and Base Installation and Security Systems shops combined their efforts and came up with a new and highly visible way of promoting seatbelts. They designed, built and painted two large billboards. The slogans "Are You Putting Me On?" and "Let's Get It Together" were used to describe the pictured seatbelts. One billboard is posted at the exit of the parking lot and the other is posted one block away. The members of the squadron can't help but see them as they leave each day. As visual aids, the signs are very effective in reminding personnel of their safety.

Amn Mark Goins and A1C Cyndy Howe put finishing touches on seatbelt slogan.

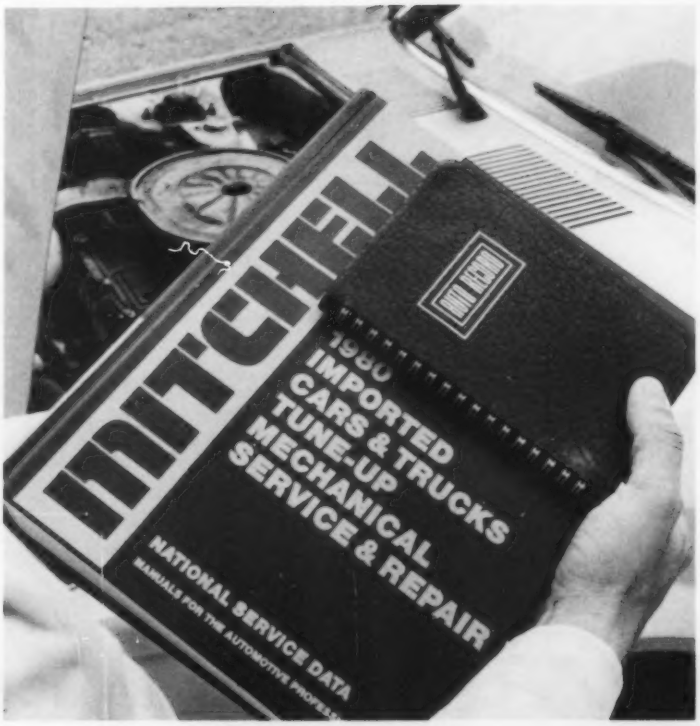
Seatbelt slogan used by 2149th Comm Sq to promote usage. It is posted billboard style near parking area.

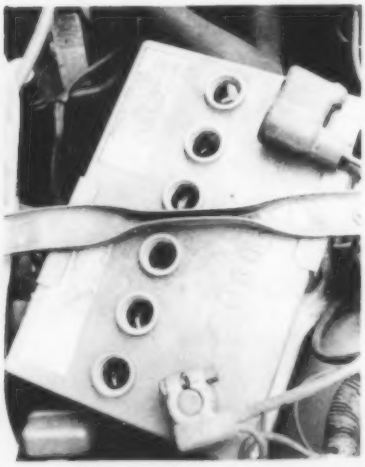
by AOI Michael S. Scholtes
NAS Lemoore, CALIF.

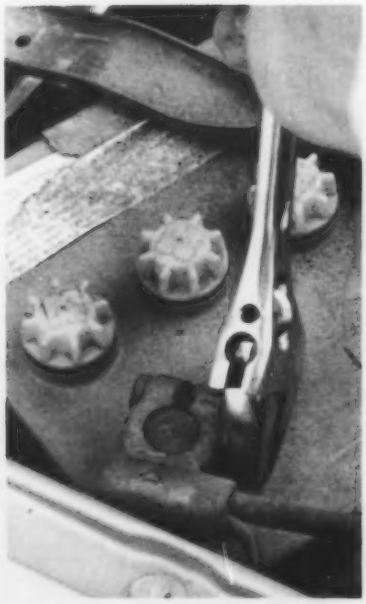
Safe, NON-TOXIC
Easy TO USE
Available IN MOST AUTOS
Tailored TO FIT
Basic SAFETY DEVICE FOR PASSENGERS
Effective WHEN USED
Legal FOR USE
Talent NOT REQUIRED TO INSTALL OR REMOVE
Survivability INCREASED WHEN USED

(right)
When your auto record book tells you it's been 15,000 miles or one year since your car's last tuneup, it's time to grab a good workshop manual and bring your engine up to specifications.

(below)
Wear eye protection when checking the fluid level in the battery cells.







Always disconnect the ground (negative, on most cars) first and reconnect it last.

The air cleaner should be checked every year and replaced every other tuneup no matter how good it looks.

You can see how the dirty air cleaner on the left would restrict air flow.

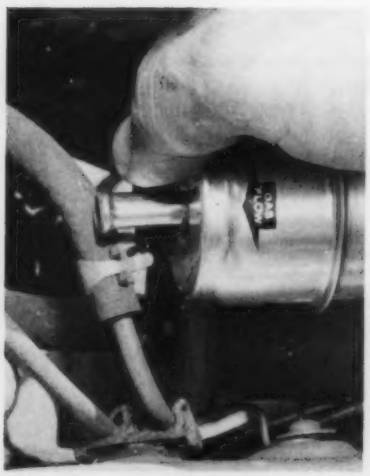
THE THREE-PART

2 1/3 Gasoline ENGINE Tuneup

Introduction

Tuning your vehicle is one of the best preventive maintenance steps you can take. Besides avoiding costly breakdowns, tuneups prevent wasteful consumption of fuel as well as your dollars.

Studies have found that 42 out of every 100 vehicles show signs of improper engine maintenance and are wasting fuel. Yet the average tuneup improves fuel economy 11.7 percent. And, in some cases, 50 percent improvements have resulted from such maintenance. In addition, an average tuneup will pay for itself in 7000 miles — 2500 miles if you do the work yourself.



Make sure the gas flow arrow is pointing in the right direction when replacing the fuel filter.

Instead of waiting for a noticeable drop in your mileage — rough idling, hesitation, dieseling, hard starting, stalling, surging, pinging, misfire or lack of power — you should tune your car annually or every 15,000 miles if you drive more than that each year.

While there are no magic tricks or gadgets that are going to double your car's miles per gallon, it is going to operate at its best when tuned properly to the manufacturer's specifications. Thus the best way to maximize your car's mileage and performance is to give it a thorough tuneup.

Because the key to a proper tuneup is setting the vehicle to the manufacturer's specifications, you'll need a good workshop manual for your specific vehicle. In addition to providing all the correct specifications, such manuals furnish information and procedures for routine maintenance and servicing as well as diagnostic and repair procedures to follow when trouble occurs. As procedures do vary from vehicle to vehicle, you'll only be able to use the Backyard Mechanic as a general guide.

Be sure to read the tuneup section of the manual from start to finish before tackling the job. You'll not only get a good idea about what's involved, as well as what parts and tools will be required, but you also may find very helpful hints buried in the fine print. Sometimes there's even a hint about step 11 written in step 37.

Furthermore, after reading the tuneup section you may decide the work is beyond your skills and have a professional do the job for you. You'll still be ahead of the game because you'll have a better understanding of what has to be done and how.

After reviewing the manual, the first step in a tuneup is a quick inspection of the basic components that affect reliability and performance.

First, after removing any jewelry, pop the battery filler caps off and check the fluid level. Don't look directly into the cells without wearing some sort of eye protection. If the fluid level is below the fill line or doesn't cover the tops of the plates in all the cells, bring it up with distilled water. Tap water is okay in emergencies only.

Of course you can't check the fluid level in a maintenance-free battery, but there are some checks that can be performed, so read your owner's manual to find out what they are.

Next make sure the battery case and terminals are clean. When removing the battery cables, be sure to disconnect the ground cable first (the cable that runs to the frame or engine — usually negative). When reconnecting the cables, do the ground last.

Terminal and connection corrosion (white fluffy deposits that are brittle to the touch) should be cleaned off with steel wool, a wire brush or a special cleaning tool until the metal is bright. A dirty battery case can be washed with a baking soda and water solution and rinsed with clean water. Be careful not to get any of the soda solution in the cells.

Trace the positive cable to make sure all electrical connections are tight, especially at the starter. The cables should be replaced every four years or 50,000 miles as part of a preventive maintenance program.

Put grease or petroleum jelly around the base of the terminals — not on the terminals — before reconnecting the cables. After reconnecting the cables, also coat the top of the cleaned battery terminals. The coat-

continued

The PCV valve is usually located in the rocker arm or valve cover.

The PCV filter is found in the air cleaner housing and should be replaced when the PCV valve is.

If you hear any rattling when tapping the fuel evaporation system canister, replace it.

2 1/3 Gasoline ENGINE Tuneup

ing helps prevent corrosion.

A dirty air filter restricts the air flow to the carburetor and causes the engine to burn more fuel than necessary. So, a clean air filter is essential for the best performance and mpg.

The air filter is usually located in a housing on top of the engine. In most cases, removing a single wing nut will allow you to lift the top plate off the housing and pull the paper element filter out. If there are any vacuum hoses attached to the top plate, be sure to mark them in some way (such as with matching tape numbers) so that you can reattach them properly.

Be very careful not to drop anything down the carburetor.

Check the filter by holding it up to bright sunlight or to a light bulb. If you can't see light coming through all the way around the filter, it should be replaced. If the filter is more than two years old or has been in service more than 30,000 miles, replace it anyway.

Before putting an old filter back into the housing, wipe it clean with a rag. And regardless of whether you're using the old filter or a new one, wipe the housing clean too. Be sure the filter seats properly in the bottom of the housing before replacing the lid.

A plugged fuel filter can stall your engine completely without warning. Since there's no way to check the filter it should be replaced at every tuneup.

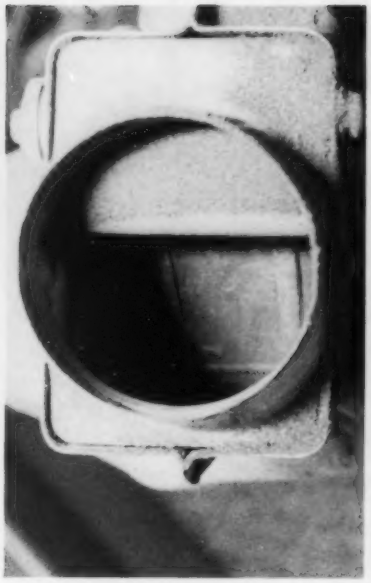
There are two basic types of fuel filters — the type used on most General Motors products installs inside the carb. Most other vehicles use an in-line filter that clamps in the fuel line between the fuel pump and the carburetor.

The GM-type filter can be replaced by very carefully removing the fuel line at the carburetor while holding a rag under the line connection to catch leaking gasoline. When you remove the line note how the filter and spring insert in the filter housing so you can install the new filter correctly.

The in-line filter either clamps into the fuel line or, on most Ford products, it screws into the carburetor with the fuel line clamped to the other end. When removing this type of fuel filter, also be sure to have a rag under the connections to catch leaking gasoline. Be sure to clamp the new filter into place exactly as the old filter came out, and be certain that any arrows on the filter point toward the carburetor.

Emissions systems have to be properly maintained to keep emissions down and performance up. During a tuneup your main concerns should be the Positive Crankcase Ventilation (PCV) system, Exhaust Gas Recirculation (EGR) valve, fuel evaporation system canister, manifold heat control valve and thermostatic air control system. Your car may have all or only some of these systems, or, if it is a pre-1968 model (other than

Although the EGR valve is often hard to locate on the intake manifold, it must be checked at every tuneup.



Another hard-to-see item is the flapper in the air cleaner snorkel. This one is closed, as it should be when the engine is cold.

Plug wires are removed by grabbing the boot (and only the boot), twisting until it "pops" and then pulling them off the spark plug.

California vehicles), it may have none.

The PCV valve is usually pushed into one of the rocker arm or valve covers on the engine with a hose connecting it to either the carburetor or intake manifold. The simplest way to check its operation is to put a sheet of paper over the oil filler neck with the engine running. If the paper is pulled in by the suction, the system is operating.

Another way to check PCV valve operation is to remove the valve from its rubber grommet seat and press your finger over its open end. Engine speed should drop at least 40 rpm if the valve is functioning properly.

Regardless of how good the valve acts, replace it every three years or 40,000 miles.

Also check the rubber grommet in the cover for damage. If it is faulty, replace it with a new one. Also replace it when installing a new PCV valve. When reinstalling the PCV valve make sure that it is properly seated and/or clamped in its hose, the end pushed securely into its rocker cover seat.

On nearly all cars there is also a PCV filter located inside the air cleaner housing. It should be inspected and replaced when the PCV valve is.

The EGR valve is normally located on the intake manifold, near the carburetor. With the engine warmed up and running at slow idle, disconnect the hose leading to the EGR and attach a hand vacuum pump to the valve. Pump the tool until it reads at least four inches of mercury. The engine should either start running rough and missing or stop. If it doesn't, the EGR valve needs servicing or, in most cases, replacing.

The complicated looking fuel evaporation system is really one of the simplest and most trouble-free portions of the emissions network. You can usually tell if it isn't working right because there'll be a strong odor of gasoline present.

At tuneup time you'll want to check the hoses for cracks and secure connections, and test the purge valve(s). As these tests vary from vehicle to vehicle, consult your car's workshop manual for details.

Basically you are going to disconnect and plug the purge valve's vacuum source and make sure that air doesn't pass through the valve. Then reconnect (and unplug) the vacuum line and ensure that air does go through the valve when the engine is running between 1,500 and 2,000.

The fuel evaporation system canister should be inspected for charcoal leakage and loose internal parts. Tap the charcoal canister and if you hear any rattling noise, replace it.

Most American-built cars have canisters with replaceable filters in the base. While one manufacturer suggests replacing the filter every 15,000 miles and the canister every

continued

continued

Inspect inside the rubber plug wire boot for corrosion.

2 1/3 Gasoline ENGINE Tuneup

30,000, another says the filter should last 30,000, and the other says no service is needed. Replacing the filter every other tuneup should be adequate.

Older model cars will have a manifold heat control valve located on the exhaust pipe or crossover near the exhaust manifold. When the engine is cold — and turned off — see if you can move the valve. If you can, give both ends of the valve's shaft a shot of manifold heat control valve solvent. If it's stuck, try tapping it lightly with a plastic mallet to free it up. Once it is free moving, be sure to lubricate it.

Most cars built since 1971 and many older than that have thermostatic air control systems instead of a manifold heat control valve (a few still use both). Vehicles with thermostatically-controlled air cleaners will have a hot air tube or pipe running from the exhaust manifold to the air cleaner intake. Inside the long snorkel air cleaner intake, about where the hot air tube or pipe connects to it, is a vacuum flapper door.

The best way to test this system is with both the engine and outside air cold. Start the engine and keep your eye on the flapper door: It should close over the snorkel. As the engine warms up to operating temperature, the flapper should open to allow cooler air into the air cleaner. This could take a minute, or 10 to 15 minutes.

If the valve doesn't open by the time the engine has reached 100 to 120 degrees Fahrenheit some repairs are required.

All the emissions system and vacuum hoses should also be inspected for cracking, loose clamps and leaking. Trace the full length of each hose — removing the air cleaner if necessary — squeezing it to check for cracks and look for swelling, discoloration and leaks.

If there are a lot of miles on the vehicle and one or more of the hoses are suspect, it's a good idea to replace them all. Measure the length and inside diameter of each hose, obtaining and cutting each replacement to size. Replace each hose one at a time to avoid the possibility of confusion.

Spark plug wires are probably among the most neglected tuneup items next to the spark plugs, and air and fuel filters. As a result they can and do cause plenty of problems.

Inspect the wires one at a time to avoid mixing up their order. Begin by disconnecting the wire from the spark plug. A special removal tool can be very helpful for this since it prevents damage to the wire. Without the tool you must grab the wire's rubber boot, twist slightly until it "pops" and then pull the wire free. Be sure that you are pulling on the boot, not the wire.

Inspect inside the boot for a white crusty powder which is a sign of corrosion. Don't mistake the white conductive grease currently being used for corrosion. While it may be possible to clean the corrosion from the boot, it would be better to replace the wire.

Push the boot and wire back onto the spark plug. It should fit tightly. If it doesn't, pull it back off and use a

Inspect each wire for burns, cracks and other damage while wiping it clean.

pair of pliers to carefully crimp the metal connector inside the boot until the fit is snug.

Now use a clean rag and remove all the dirt and grease from the full length of the wire. As you're doing this, check for burns, cracks or other damage. Bend the wire in several places to ensure that the conductive core inside has not hardened. But remember the core is brittle and will not tolerate rough handling.

Disconnect the wire at the distributor (again, pulling and twisting the rubber boot only). Check this end for corrosion and a tight fit also. Now check the remaining spark plug wires in the same way, making sure they are all securely fastened to the spark plug and distributor, as well as clean and in good condition.

Check all vacuum lines for cracks and other signs of leaks. This one will have to be replaced.

A visual check of the wires can also be made in a darkened garage. Make sure the garage is well ventilated before starting the engine and looking at each plug wire. If there is a break or fault in the wire, you will see a small spark or arcing at the bad area.

You can also run a continuity test on each wire with a voltmeter and a 12-volt battery. Connect the wire being tested in series with the voltmeter. If the voltage ranges from 7.8 to 12.4 volts, the wire is good. If the voltage is less than 7.8 volts, replace the wire.

Keep in mind that if one wire is bad, the others will probably fail soon, too. Regardless of how good they seem, you should replace the wires every other tuneup.

The best way to install new wires is to buy a replacement kit designed specially for your car's engine. These kits come with wires pre-cut to the proper length and with the rubber boots already installed. The only trick is to replace one wire at a time so that you keep the proper firing order.

continued

Safety First

Set the parking brake and chock the wheels. Put manual transmission in neutral, automatic in park.

Operate the engine in well-ventilated areas only.

Keep hands, hair, loose clothing and test leads well away from moving engine parts.

Don't touch hot exhaust manifolds, radiators, spark plugs and coil terminals.

Never look into a carburetor while the engine is being cranked or is running.

Don't smoke, use open flame (torch) or allow sparks to occur near the carburetor, fuel line, fuel filter, fuel pump, spilled gasoline, cleaning solvents, other flammables or a charging battery.

Be very cautious using anything electrical within 18 inches of the floor.

Gasoline is NOT a cleaning solvent.

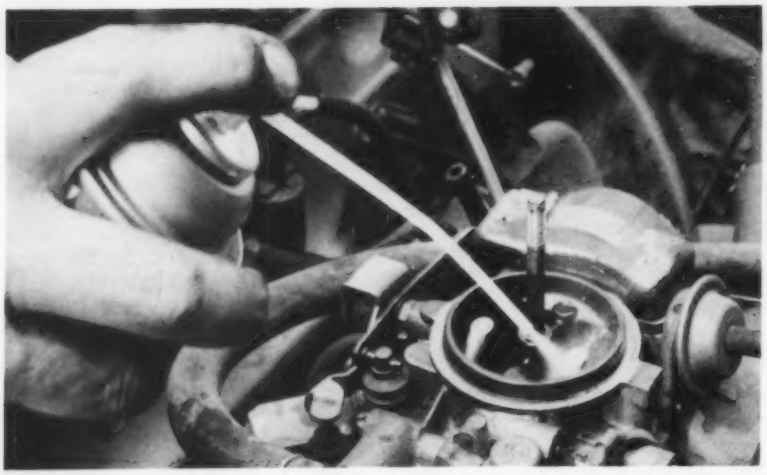
Keep a fire extinguisher rated for gasoline and electrical fires handy.

Use the proper tool of the proper size and fit for every job.

Wear safety goggles when drilling, grinding, or using a chisel.

Uniform of the day — Wearing coveralls to protect your clothing and yourself from dirt and grease is a very good idea. Now, tie up your long hair and remove any rings, watches, bracelets and other jewelry you're wearing. If that ring is so sentimental that you won't (or can't) take it off, cover it with duct tape. You might want to wrap those loose legs with tape to keep them out of harm's way, too.

continued



Clean the inside of the carburetor according to the instructions of the carburetor combustion chamber cleaner can.

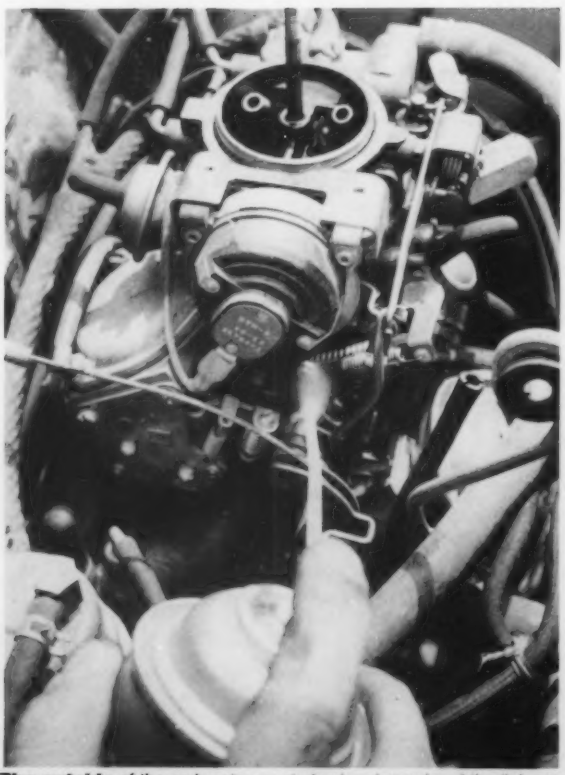
At every tuneup, if not more frequently, a can of carburetor combustion chamber cleaner should be sprayed down the carb's throat according to the can's instructions. The outside of the carburetor — especially the choke plate and linkages — should also be sprayed clean with carburetor cleaner or choke solvent.

Move the throttle linkage back and forth once or twice. If gasoline doesn't shoot into the carburetor, check the fuel system for a malfunction before continuing the tuneup.

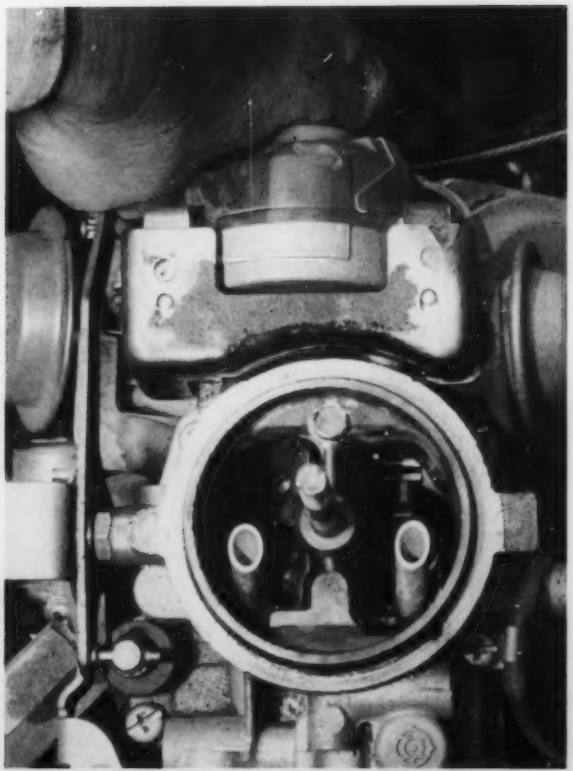
With the engine cold, start it and make sure that the choke closes and then fully opens as the engine warms up. If it doesn't, check its operation following your workshop manual.

After checking other basics such as drive belts, radiator hoses, coolant level, etc., you'll be ready to get into the actual tuneup in next month's DRIVER.

2 1 3 Gasoline ENGINE Tuneup



The outside of the carburetor must also be cleaned and the linkage lubricated.



Raw fuel should shoot into the carburetor when the throttle is moved back and forth.

school's OUT

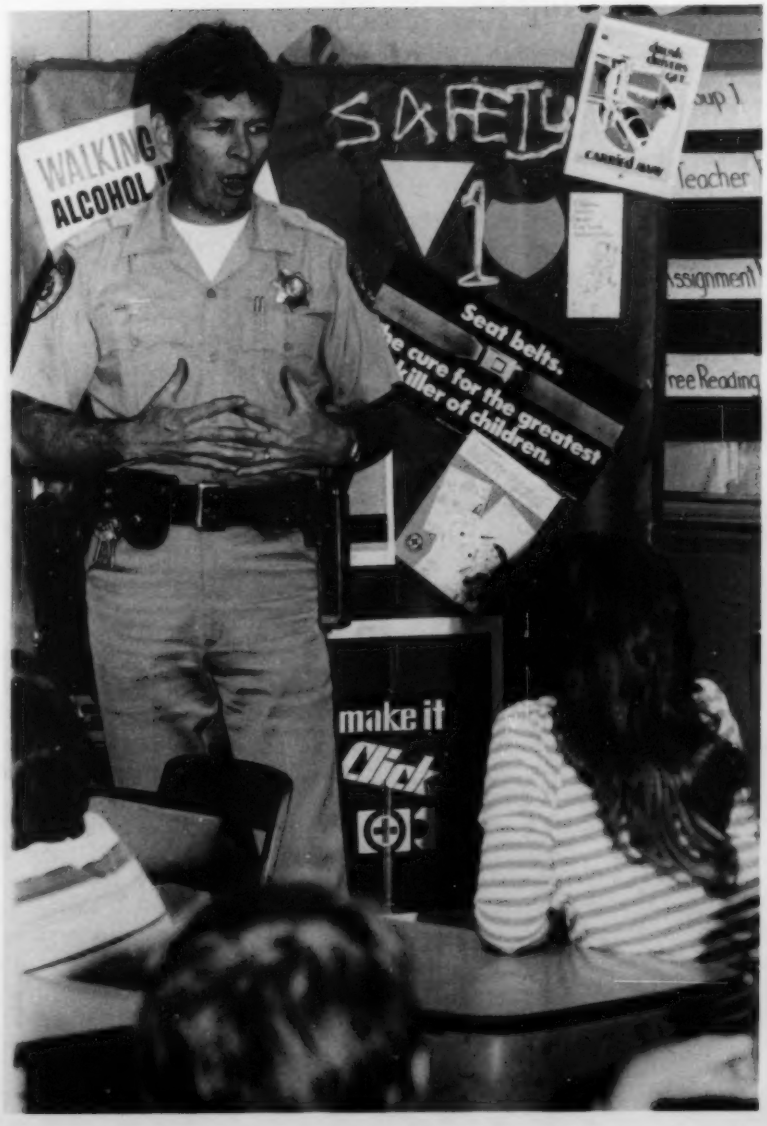
Just before school let out teachers and highway patrol officers everywhere took the time to remind children that car drivers might not be looking for them, so they should be extra careful when playing near the street during summer vacation.

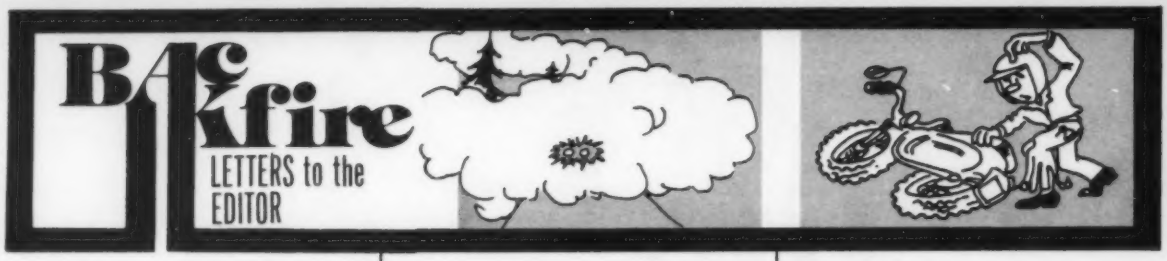
Although children usually have good eyesight, fast reactions and agility, their lack of experience and poor judgment often offset these abilities. And the younger ones also may suffer from undeveloped physical coordination.

The actions of children include playing in the street, running from between parked cars, dashing across streets without looking, chasing someone or pursuing pets, balls or other objects. Actions that you, as a driver, must guard against.

Although only 30 percent of the population is under age 14, they account for 52 percent of all pedestrian deaths and injuries.

Another lesson children are taught that you can also learn from is: use seat belts.





WHICH FOGLIGHT IN WHAT COUNTRY?

The article "Who'll Stop the Rain?" in the March 1983 issue of DRIVER Magazine provided excellent safe driving tips for bad weather driving. However, the writer stated that Germany *requires* the mounting of a single red fog light on the back of cars. That information is incorrect. The mounting of a fog light in Germany is optional. It used to be a mandatory requirement.

Belgium has a mandatory requirement for at least one red rear fog light. This light must be of an approved type and marked B1. It must be fitted at the middle or between the middle and the left rear of the vehicle. Two red rear fog lights may be fitted. In this case, the lights must be marked B2. Since every car registered initially under the SHAPE system is required to undergo a tough safety inspection by the Belgian authorities (Controlle Technique), owners must ensure that the red rear fog light is properly fitted prior to this inspection.

The proper fog lights can be purchased locally at the Post Exchange in Chievres, Belgium. Besides the fog light requirement, Belgium also requires the warning triangle, a first aid kit (DIN standard) and a fire extinguisher mounted within easy reach of the driver. Fire extinguishers from the United States do not meet the Belgian code. Buy it when you get overseas.

I hope that my information is helpful to service members going to SHAPE, Belgium. DRIVER Magazine is a super publication. Keep up the good work.

CSM Georg H. Tietze, USA
Frederick, MA 21701

NEVER DID LEARN WHAT CAUSED IT.

Just finished reading about the experience of SSgt Mark Joecks in the February 1983 issue of DRIVER and would like to tell you about my experience.

I am not a youngster and have owned several motorcycles over the years. Some two years ago I got a good deal on a used Honda 185 Twinstar and decided it would be ideal for transportation while assigned to Fort Hood, Texas. I spent several hours playing with it (learning where all the controls were and how everything functioned) one weekend. Like a lot of riders, to me wearing a helmet was like washing your feet with your socks on. First of all, I'm a damn good rider! I'm careful, I watch for any possible hazard (moving or otherwise). I am constantly aware of what's happening behind, to the sides, and in front of me. However, because it is mandatory on Fort Hood and I *can* see the value of it, I *do* wear my helmet when riding.

One day about 1800, I prepared to head home. I was wearing fatigues and a field jacket, and my helmet with chinstrap and visor in place. I checked all functions, and cranked up. At the exit from the parking lot, I carefully checked for any traffic or other hazards. There was one car in sight about 50 feet away and heading west. Since I was going east, the car was no problem. As I entered the road turning east, something happened.

Never did learn what caused it, but everything seemed to take place in slow motion. With the front wheel turned right, the rear wheel suddenly skidded to the left and jumped about two feet into the air. The whole bike slammed to the pavement on the right side and continued sliding across the pavement into the path of the oncoming car. I held onto the bike only long enough to hit the emergency shutoff switch, then let go. Both the oncoming car and sliding bike stopped at the same time — with the car's bumper nudging my bike. Of course I was shaken, and after getting the bike back onto its wheels, I attempted to determine what had happened. Had I overlooked some kind of grease spot? No, none there. Had I hit a rock or something? Couldn't find anything. Had I been using excessive speed in some way? Don't think so because I always start off slowly — no jack rabbit starts for me. Never was able to figure out what had happened.

Before cranking up and heading for home, a damage assessment was made. For me: right fatigue pants leg ripped to shreads, a very slight scrape to the right knee, bad bruise on the right hip where it had slammed into the pavement. For the bike: bent right turn indicator, and scrapes on the right edge of the windshield. For the helmet: scrapes on the right side and rear, and one fairly deep gouge on the right side. The only serious damage was a new pair of fatigue pants ruined.

What did I learn from this? (1) Even the most careful rider can have an accident. (2) Helmets save! (3) Any kind of protective clothing can help lessen, if not prevent, injury. (4)

It is extremely important to know your machine and equipment and to use them properly.

Thanks for allowing me to tell you about my experience.

SSG David Taylor, USA
APO SF, 96358

DRIVER AWARENESS

I would like to say that I have enjoyed reading DRIVER over the last six years. I think that you have succeeded in raising driver awareness and safety consciousness. We all make mistakes sometimes but we must never make the mistake of forgetting about safety.

Thank you for your reminders.

SSgt Bob Hampton, USAF
Conroe, TX 77301

THE HELMET GOES WITH THE HEAD!

I always read your publication with interest and the article on helmet removal, April 1983, I read with great interest, both as an Army civilian safety specialist and as a former flagger (corner worker) with Sports Car Club of America, New England Region.

As flaggers we were taught that "The helmet goes with the head, even unto the hospital!" The reasons being (1) We were not really qualified to remove a helmet from a comatose victim who might have a broken neck. We were only qualified to secure the victim to a back board with cervical collar; (2) All racing helmets contain pertinent information on the back such as name, blood type, allergies, use of glasses, contacts, false teeth and hearing aids, which are nice things for hospital personnel to know; (3) Full face helmets, the norm in auto racing, would better be cut off a victims head (except in rare cases) at the hospital.

We were also told that the removal of a full face helmet sequence was as follows: Remove clear face shield, remove victims glasses if worn, press forehead back into helmet padding, tilt lower bar forward by pressing with opposite hand behind lower head. This was only done in extreme emergencies, and even though one person could do it, two were recommended. To the best of my knowledge nothing except some helmet styles have changed.

Cecil V. Anderson
Fort Devens, MA 01433

The information in our article is from the American College of Surgeons and is for trained *people such as emergency room personnel. It is the correct procedure and requires two people. As we said in our article, untrained people may raise the face shield of a helmeted victim but might do more harm than good by removing the helmet. If you come to the scene of a motorcycle accident, the most helpful thing you can do is call an ambulance.*

SURVIVAL OF THE FITTEST?

Do you believe in survival of the fittest? I do, sort of. If some people refuse to wear seat belts, let them. Soon by the process of elimination, all of those who refuse will be gone! Then everyone will be happy. You will be happy to not have to write any more very repetitious articles on seat belts. And we (belt wearers) will not have to read any repetitious articles on seat belts. Wouldn't that be great?

As for the double nickel, who really needs it? Most people drive over 55 anyway, with speeds increasing. But deaths are still decreasing?

Recent studies in Florida where state police were instructed not to give speeding tickets showed a drastic decrease in accidents. This is due to police being able to better patrol for crazies and sick drunks.

SSgt Douglas A. Holmes, USAF
Maxwell AFB, AL 36112

Highway fatalities decrease in economic recessions. That's a fact, but nobody has been able to pin down the exact reasons. So for as hammering away on the lifesaving usefulness of safety belts, what other way is there to convince people to buckle up?

"SEE-ME FLAGS"

One of the most effective means to increase the visibility of bicyclists is to install a "see-me flag" on the machine.

None of the bikes pictured in your April 1983 article "Living With B.A. Drivers" were equipped with them, nor were they mentioned in the text. They are mandatory on my base if the bike is ridden on major roads!

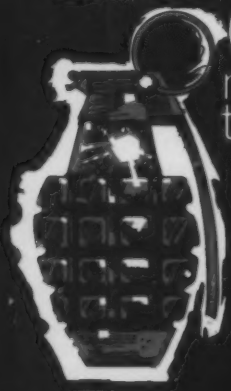
Ms. N.M. Reinhardt
NAS Pensacola, FL 32508

We hadn't heard of the flags being mandatory anywhere; if they are, of course, get them. Even if they are not required they could help drivers to see you.

☆U.S. GOVERNMENT PRINTING OFFICE: 1983 683—027/8

you wouldn't LEND A friend:

a rattlesnake or a man-eating tiger or a hand grenade



...then why do you let him borrow Your MOTORCYCLE?

That's right. Friends don't lend friends their motorcycles. Too many good people are getting killed on borrowed machines. They just want to go for a little test ride, but 30 minutes later they're dead. Not because they didn't know how to ride, but because they didn't have experience on this particular bike. If you want to keep your friends, say no when they ask to borrow your motorcycle.